REMARKS

This responds to the Office Action mailed on December 17, 2007. Reconsideration is respectfully requested.

By this amendment, claim 1 is amended, no claims are canceled, and no claims are added; as a result, claims 1, 2, 4, 6 – 14, 17 and 18 remain pending in this application. Claims 15 – 16 and 20 – 33 are withdrawn from consideration.

§103 Rejection of the Claims

Claims 1, 2, 4, 9-14 and 17-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Burdon et al. (U.S.6,572,830) in view of Riemer et al. (U.S. 5,886,671).

Applicant's claims 1, 2, 4, 9 – 14 and 17 – 18 are directed to a surface-heating system that includes an active reflect-array antenna system and a low-power feed. The active reflect-array antenna system provides a collimated high-power wavefront at a millimeter-wave frequency in a direction of a surface to heat the surface within a surface depth by amplifying and reflecting a spatially-fed millimeter-wave lower-power wavefront. The low-power feed provides the spatially-fed millimeter-wave lower-power wavefront for incident on the active reflect-array.

Claim 2 for example, recites that the active reflect-array antenna system comprises a plurality of individual semiconductor wafers arranged together on a surface. As further recited in claim 2, each semiconductor wafer comprises a receive antenna to receive signals of the spatially-fed millimeter-wave lower-power wavefront, a set of power amplifiers coupled to the receive antenna to amplify the received signals, and a transmit antenna to transmit amplified millimeter-wave signals. As further recited in claim 2, the amplified millimeter-wave signals from the transmit antennas of each semiconductor wafer spatially combine to generate the collimated high-power wavefront.

Applicant submits that none of the cited references, either separately, or in combination, teach, suggest or motivate the following elements recited in claim 1:

1) an active reflect-array antenna configured to amplify and reflect spatially-fed signals;

2) an active reflect-array antenna that provides a collimated wavefront; and

3) the use of millimeter-wave signals to heat within a surface depth;

Applicant further submits that none of the cited references, either separately, or in combination, teach, suggest or motivate the following elements recited in claim 2:

1) a plurality of semiconductor wafers arranged on a surface, each with a receive antenna, an amplifier and a transmit antenna (per claim 2); and

2) the spatial-combining of amplified millimeter-wave signals transmitted by the transmit antennas of each semiconductor wafer (per claim 2).

According to the Examiner, Burdon discloses all the features of the claimed invention but fails to explicitly show an array comprised of wafers. Applicant notes that claim 1, for example, does not recite an array comprised of wafers. Applicant submits that Burdon does not disclose all the features of the claimed invention. Burdon is directed to microfluidic devices arranged in multiple layers to provide integrated and monolithic structures. Burdon discloses sintering together green-sheet layers. Applicant's claim 1, however, discloses an active reflect array antenna system that amplifies and reflects millimeter-wave signals. Applicant's claim 2 recites that the active reflect-array antenna system comprises a plurality of individual semiconductor wafers arranged together on a surface. Burdon discloses layers of green-sheet sintered together to form a single monolithic structure. Applicant's semiconductor wafers are recited to be *individual wafers* arranged together on a surface. In view of this, Applicant submits that combining Burdon with any of the other cited references does not result in Applicant's claimed invention.

Applicant's claim 4, for example, recites that the semiconductor wafers are arranged in a substantially parabolic shape. Because a single monolithic structure cannot be parabolic shaped, the individual semiconductor wafers of Applicant's claims 2 and 4, are recited as separate wafers so that they may be arranged on a non-flat parabolic surface. Because Burdon is directed to generating a single monolithic structure, Applicant submits that Burdon ***teaches away*** from Applicant's claimed invention as recited in claims 2 and 4 because Burtons's structure must be flat.

Applicant further submits that Burdon is non-analogous art because it is directed to semiconductor fabrication while Applicant's invention is directed to a surface-heating system that uses an active reflect-array antenna system. Analogous art is all art that is either in the field of technology of the claimed invention or deals with the same problem solved by the claimed

invention even though outside the field of technology. *In re Wood*, 599 F.2d 1032, 202 USPQ 171 (CCPA 1979). Since the problems solved by Burdon relate to fabricating multi-layered substrates while Applicant's claims are directed to surface-heating using millimeter waves, Applicant submits that those of skill in the art would not look to the field of fabricating multi-layered substrates to solve problems related to surface-heating using millimeter waves. This is further emphasized by the fact at Burdon is in US class and field of search 422, not in field 343.

According to the Examiner, Riemer discloses a reflection system that redirects waves and uses an antenna array. Applicant respectfully disagrees with this interpretation of Riemer as applied to Applicant's claims and submits that Riemer does not teach, suggest, or motivate the reflection of a received wavefront to generate a collimated-high-power wavefront as recited in Applicant's amended claim 1.

In Riemer, signals are received from DBS satellites using probes 502 and 504 and processed in module 408 (see Riemer FIG. 5). The processed signals from a module 408 are combined with signals from other modules 408 in a stripline combining network (see Riemer FIG. 5). After being combined, the received DBS satellite signals are provided to active phased-array modules 1200 which transmit the signals. In other words, Riemer discloses a repeater.

The only ***reflection*** of signals mentioned in Riemer is the reflection of electromagnetic (EM) signals by circular metal plate 1214 within metal can 602 for the purpose of lowering the waveguide cutoff frequency (see Riemer column 17, lines 23 – 33 and FIG. 12). The phased-array antenna of Riemer uses active phased-array modules 1200 to transmit signals. In Riemer, microstrip-to-waveguide transitions use radiating probes 1204 to convert RF signals from stripline for transmission by each module. The RF signals are provided by the stripline combining network from electronic modules 408 to probes 1204 (see Riemer column 16, lines 56 – 67 through column 17 lines 1 – 33 and FIG. 12). In other words, Riemer's phased array transmits RF signals provided by an external source. ***There is no reflection*** of a received wavefront as recited in Applicant's claim 1. Furthermore, there is no active reflect-array antenna that ***amplifies and reflects*** spatially-fed millimeter wave signals. Furthermore, there is no active reflect-array antenna that comprises individual semiconductor wafers that individually receive, amplify, and retransmit signals, as recited in claim 2.

Accordingly, the combination of Burdon and Reimer does not result in Applicant's claims 1, 2, 4, 9-14 and 17-18. Furthermore, as discussed above, Burdon is believed to be non-analogous art and the combination is therefore believed to be improper. As also discussed above, Burdon is believed to teach away from Applicant's claimed invention as recited in claims 2 and 4 and therefore there would be no suggestion or motivation to combine Burdon with another reference to result in Applicant's claimed invention. Therefore, Applicant believes that the rejection of claims 1, 2, 4, 9-14 and 17-18 under 35 U.S.C. § 103(a) has been overcome.

Claims 6-8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Burdon et al. in view of Brown et al. (U.S. 6,765,535) as applied to claims 1-5 and 9-19, and further in view of Dion et al. (U.S. 5,101,086).

As discussed above, Burdon does not teach, suggest, or motive an active reflect-array antenna configured to amplify and reflect spatially-fed signals, nor does Burdon teach, suggest, or motivate an active reflect-array antenna that provides a collimated wavefront. As also discussed above, Riemer does not teach, suggest, or motivate the reflection of a received wavefront to generate a collimated-high-power wavefront as recited in Applicant's amended claim 1.

Brown has been cited by the Examiner, but it is unclear as to what in Brown the Examiner is referring to as there is no mention what aspect of Applicant's claims is disclosed in Brown. Applicant submits that Brown, U.S. Pat. No. 6,765,535, is disqualified as prior art under 35 U.S.C. §102(e)/103 because at the time the present invention was made, both the Brown patent and the present invention were owned and were under an obligation of assignment to the same entity. Applicant has below provided a statement concerning common ownership.

According to the MPEP 706.02(l)(2), "Applications and references will be considered by the Examiner to be owned by, or subject to an obligation of assignment to the same person, at the time the invention was made, if the Applicant(s) or an attorney or agent or record makes a statement to the effect that the application and the reference were, at the time the invention was made, owned by, or subject to an obligation of assignment to, the same person."

STATEMENT CONCERNING COMMON OWNERSHIP

Application Serial Number 10/693,125 (the present application) and U.S. Patent No. 6,765,535 (Brown) were, at the time the invention of Application 10/693,125 was made, owned be and/or under an obligation of assignment to the Raytheon Company.

Dion has been cited by the Examiner in the rejection of claims 6 – 8 for disclosing a surface temperature sensor. Although Dion discloses surface temperature sensors, Applicant submits that Dion is non-analogous art. Dion is directed to induction heating using a magnetic core. The heat is generated by eddy currents resulting from a variable magnetic field (see Dion abstract and column 1, lines 8 - 25). Applicant submits that this is different than surface heating with a directed high-power millimeter-wave wavefront. In Dion, an open core of ferrite material wrapped with a coil is embedded in a thermally conductive material. Dion does not use directed millimeter-waves, but excites a coil with frequencies between 12 to 25 kHz (see Dion abstract).

Dion is non-analogous art because it is directed to induction heating while Applicant's invention is directed to a surface-heating system that using millimeter-waves. Analogous art is all art that is either in the field of technology of the claimed invention or deals with the same problem solved by the claimed invention even though outside the field of technology. *In re Wood*, 599 F.2d 1032, 202 USPQ 171 (CCPA 1979). Since the problems solved by Dion relate to induction heating in electrically conductive material, while Applicant's claims are directed to surface-heating using millimeter waves, Applicant submits that those of skill in the art would not look to the field of induction heating to solve problems related to surface-heating using millimeter waves. This is further emphasized by the fact at Dion is in US class and field of search 219, not in field 343.

Discussion of other claims:

Applicant's claim 8 recites that the antenna system generates a pulsed high-power wavefront and that the antenna system reduces one of either a pulse-repetition-rate or a pulse-duration time of the high-power wavefront in response to the control signal to control the surface temperature. Applicant's find no teaching, suggestion, or motivation in any of the cited references to 1) generate a pulsed high-power wavefront, or 2) reduces either a pulse-repetition-rate or a pulse-duration time of the high-power wavefront to control a surface temperature.

In Riemer, DBS signals are transmitted, so there is no pulse-repetition-rate or pulse-duration time. In Burdon, no RF signals are used. In Dion, continuous wave low-frequency signals are used (see Dion column 3, lines 30 – 36). The use of millimeter-wave pulsed signals in a wrapped open core of ferrite material would generate virtually no EM field. Applicant submits that Dion's induction heating system would be inoperable with millimeter-wave signals because millimeter wave signals would not propagate through a coil of wire generating a magnetic field. A waveguide, microstrip line, a stripline or other signal path suitable for millimeter-waves would be required, none of which is taught by Dion.

Claim 11, as amended, further distinguishes over the cited references by reciting that the low-power feed is also an active reflect array. In these embodiments, two active reflect arrays are recited (i.e., the low-power feed and the active reflect array). In these embodiments, a source provides millimeter-wave signals that are received, amplified, and then re-transmitted by the low-power feed for incidence on the active-reflect array. The active-reflect array receives the signals, further amplifies the signals and then transmits the amplified signals to generate the collimated wavefront. None of this is taught, suggested, or motivated by the cited references.

Claim 17 further distinguishes over the cited references by reciting that a plurality of differing millimeter-wave frequencies are used and that the frequency and power level of the wavefront is controlled to selectively heat layers of the surface. Claim 18 further distinguishes over the cited references by reciting that the differing millimeter-wave frequencies are time-multiplexed.

In view of the above, Applicant submits that Brown, is disqualified as prior art under 35 U.S.C. § 102(e)/103. The remaining references (Burdon, Reimer, and Dion) either separately or in combination, fail to teach, suggest or motivate the elements recited in Applicant's pending claims. Therefore, Applicant believes that the rejection of claims 6-8 under 35 U.S.C. § 103(a) has been overcome.

Reservation of Rights

In the interest of clarity and brevity, Applicant may not have equally addressed every assertion made in the Office Action, however, this does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (480) 659-3314 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date February 19, 2008

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 21 day of February 2008.

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